NPN SILICON HIGH VOLTAGE SWITCHING TRANSISTOR

CD13001

TO-92

TO-92
Plastic Package
RoHS compliant

APPLICATION:

Suitable for Low Power Electronic Lighting Ballasts, Compact Fluorescent Lamps, Converters and Inverters

ABSOLUTE MAXIMUM RATINGS (Ta = 25 ℃ Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Collector Base Voltage	V_{CBO}	500	V
Collector Emitter Voltage	V_{CEO}	400	V
Emitter Base Voltage	V_{EBO}	9.0	V
Collector Current Continuous IC A	I_C	0.5	A
Peak (1)	I_{CM}	1.5	A
Collector Power Dissipation	P_C	900	mW
Operating And Storage Junction Temperature Range	T_j, T_{stg}	-55 to +150	°C

(1) Pulse Test: Pulse Width = 5ms, Duty Cycle≤10%

ELECTRICAL CHARACTERISTICS at (Ta = 25 ℃ Unless otherwise specified)

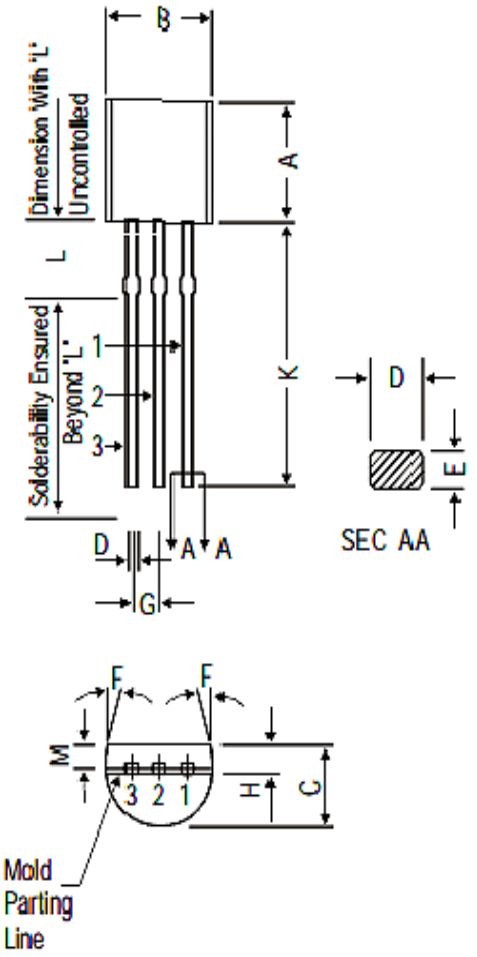
PARAMETER	SYMBOLS	TEST CONDITION	VALUE			UNIT
			MIN	TYP	MAX	
Collector Base Voltage	V_{CBO}	I_C=100mA, I_E=0	500	--	--	V
Collector Emitter Voltage	V_{CEO}	I_C=1mA, I_B=0	400	--	--	V
Emitter Base Voltage	V_{EBO}	I_E=100mA, I_C=0	9	--	--	V
Collector Cut Off Current	I_{CBO}	V_{CB}=500V, I_E = 0	--	--	100	µA
Collector Cut Off Current	I_{CEO}	V_{CE}=400V, I_B = 0	--	--	200	µA
Emitter Cut Off Current	I_{EBO}	V_{EB}=9V, I_C=0	--	--	100	µA
DC Current Gain	*h_{FE}	V_{CE}=20V, I_C=20mA	10	--	40	--
	h_{FE}	V_{CE}=10V, I_C=250mA	5	--	--	--
Collector Emitter Saturation Voltage	$V_{CE\ (sat)}$	I_C=50mA, I_B=10mA	--	--	0.5	V
Base Emitter Saturation Voltage	$V_{BE\ (sat)}$	I_C=50mA, I_B=10mA	--	--	1.2	V
Transition Frequency	f_T	V_{CE}=20V,I_C=20mA,f=1MHz	8	--	--	MHz
Fall Time	t_f	I_C=50mA, I_{B1}= -1_{B2}=5mA	--	--	0.3	µs
Storage Time	t_s	V_{CC}=45V	--	--	1.5	µs

***hFE Classifications**

Note: Product is pre selected in DC current gain (Groups A to F). CDIL reserves the right to ship any of the groups according to production availability. MARKING	**A: 10-16**	**B: 15-21**	**C: 20-26**	**D: 25-31**	**E: 30-36**	**F: 35-40**
	CD 13001 A	**CD 13001 B**	**CD 13001 C**	**CD 13001 D**	**CD 13001 E**	**CD 13001 F**

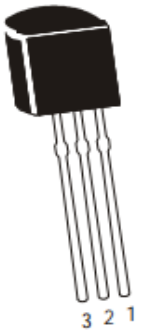
PACKAGE DETAILS

TO-92 Plastic Package



DIM	MIN.	MAX.
A	4.32	5.33
B	4.45	5.20
C	3.18	4.19
D	0.41	0.55
E	0.35	0.50
F	5 DEG	
G	1.14	1.40
H	1.20	1.40
K	12.70	--
L	1.982	2.082
M	1.03	1.20

All dimensions are in mm



PIN CONFIGURATION

1. BASE
2. COLLECTOR
3. EMITTER

Packing Details

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-92 Bulk	1K/polybag	200 gm/1K pcs	3" x 7.5" x 7.5"	5K	17" x 15" x 13.5"	80K	23 kgs
TO-92 T&A	2K/ammo box	645 gm/2K pcs	12.5" x 8" x 1.8"	2K	17" x 15" x 13.5"	32K	12.5 kgs

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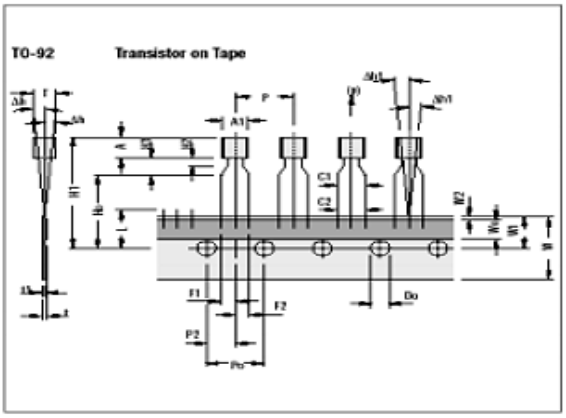
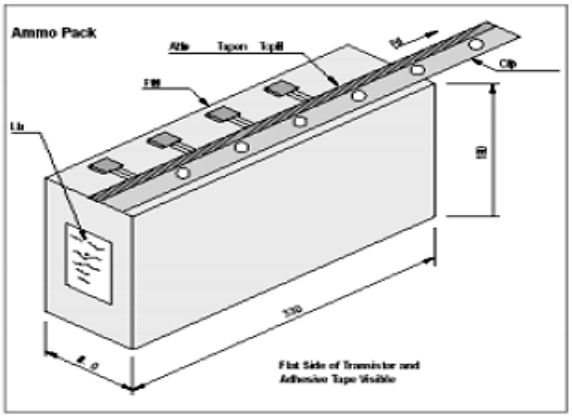
TO-92 Tape and Ammo Pack





All dimensions are in mm

Tape Specifications

ITEM	SYMBOL	SPECIFICATION			
		MIN.	NOM.	MAX.	TOL.
BODY WIDTH	A1	4.45		5.20	
Body height	A	4.32		5.33	
Body thickness	T	3.18		4.19	
Pitch of component[cr]	P		12.7		±1.0
Feed hole pitch[51]	Po		12.7		±0.3
Feed hole centre to component centre[52]	P2		6.35		±0.4
Comp. alignment,side view[53]	Dh		0	1.0	
Comp. alignment,front view [53]	Dh1		0	1.3	
Tape width[cr]	W		18		±0.5
Hole-down tape width[cr]	Wo		6		±0.2
Hole position	W1		9		±0.7-0.5
Hole-down tape position	W2	0.0		0.7	
Lead wire clinch height	Ho		16		±0.5
Component height	H1			24.0	
Length of snipped leads	L			11.0	
Feed hole diameter[cr]	Do		4		±0.2
Total tape thickness[54]	t			1.2	
Lead-to-lead distance[cr]	F1,F2	2.4		2.7	
Stand off	H2	0.45		1.45	
Clinch height	H3			3.0	
Lead parallelism[cr]	C1-C2			0.22	
pull-out force	(p)	6N			

Taping Specification

- Maximum alignment deviation between leads not to be greater than 0.20 mm.
- Maximum non-cumulative variation between tape feed holes shall not exceed 1 mm in 20 pitches.
- Hold down tape not to exceed beyond the edge(s) carrier tape and there shall be no exposure of adhesive.
- No more than 3 consecutive missing components is permitted.
- A tape trailer, having at least three feed holes is required after the last component.
- Splices shall not interfere with the sprocket feed holes.

§1 Cumulative pitch error 1.0 mm/20 pitch.
§2 To be measured at bottom of clinch.
§3 At top of body.
§4 t1 = 0.3 – 0.6 mm
Cr Critical Dimension.

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Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.
If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.
The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.
For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	**Time**	**Condition**
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH

Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).
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CDIL is a registered trademark of
Continental Device India Pvt. Limited
C-120 Naraina Industrial Area, New Delhi 110 028, India.
Telephone +91-11-2579 6150, 4141 1112 Fax +91-11-2579 5290, 4141 1119
email@cdil.com www.cdil.com
CIN No. U32109DL1964PTC004291

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